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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/352,008	07/12/1999	SONGLIN XU	AMAT/3417/ET	1579

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APPLIED MATERIALS, INC.  
2881 SCOTT BLVD. M/S 2061  
SANTA CLARA, CA 95050

EXAMINER
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GOUDREAU, GEORGE A

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 09/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09-352,008

Applicant(s)

Xu et al.

Examiner

George Goudreau

Group Art Unit

1763

— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address —

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

☒ Responsive to communication(s) filed on 8-22-03' (ie, - after final amend.)

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

☒ Claim(s) 12, 18-21, 33-34 is/are pending in the application.

Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

☒ Claim(s) 19-20, 33-34 is/are allowed.

☒ Claim(s) 12, 18, 21 is/are rejected.

☐ Claim(s) \_\_\_\_\_ is/are objected to.

☐ Claim(s) \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119 (a)-(d)

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).

☐ All ☐ Some\* ☐ None of the:

☐ Certified copies of the priority documents have been received.

☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.

☐ Copies of the certified copies of the priority documents have been received

in this national stage application from the International Bureau (PCT Rule 17.2(a))

\*Certified copies not received: \_\_\_\_\_.

## Attachment(s)

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). \_\_\_\_\_

☐ Interview Summary, PTO-413

☐ Notice of Reference(s) Cited, PTO-892

☐ Notice of Informal Patent Application, PTO-152

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Other \_\_\_\_\_

Office Action Summary

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1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.
2. Claims 19-20, and 33-34 are allowed.
3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

4. Claims 12, and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Qian et. al. (6,136,211).  
Qian et. al. disclose a process for simultaneously etching a Si based compound (i.e.-polysi, CZ-Si, or silicide), and cleaning an etch residue formed during the etching step using a plasma comprised of (Cl<sub>2</sub>-N<sub>2</sub>-CF<sub>4</sub>-O<sub>2</sub>). The (Cl<sub>2</sub>-N<sub>2</sub>-O<sub>2</sub>) component of the etch etches the Si based compound while forming an etching residue. The (CF<sub>4</sub>) component of the etch cleans the interior surface of the plasma etcher, and the surfaces of the substrate of the etch residue formed during the etching step. The etchant gasses may be comprised of one or more of Cl<sub>2</sub>, N<sub>2</sub>, O<sub>2</sub>, HBr, or He-O<sub>2</sub>; and the cleaning gasses may be comprised of one or more of NF<sub>3</sub>, CF<sub>4</sub>, or SF<sub>6</sub>. The volumetric flow rate of the cleaning gas to the etching gas (i.e.-CF<sub>4</sub>/(Cl<sub>2</sub>-N<sub>2</sub>)) is (1/20 to 1/1). This is discussed specifically in columns 4-13; and discussed in general in columns 1-20. This is shown in figures 1-7.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

7. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Qian et. al. as applied in paragraph 4 above.

Qian et. al. as applied in paragraph 4 above fail to disclose the following aspects of applicant's claimed invention:

-the specific etching process parameters which are claimed by the applicant

It would have been prima facie obvious to employ any of a variety of different process parameters in the etching process taught above including those which are specifically claimed by the applicant. These are all well known variables in the plasma etching art which are known to effect both the rate and quality of the plasma etching process. Further, the selection of particular values for these variables would not necessitate any undo experimentation which would be indicative of a showing of unexpected results.

Alternatively, it would have been obvious to employ the specific etch process parameters which are claimed by the applicant in the etching process which is taught above based upon In re Aller as cited below.

“Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” In re Aller, 220 F. 2d 454, 105 USPQ 233, 235 (CCPA).

Further, all of the specific etch process parameters which are claimed by the applicant are results effective variables whose values are known to effect both the rate, and the quality of the plasma etching process.

8. Applicant's arguments filed 8-22-03' have been fully considered but they are not persuasive.

Applicant argues the following points regarding the examiner's rejection of their claimed subject matter.

-Claims 12-13, and 18 must be allowable over the prior art of record since the examiner has failed to reject these claims in any of his pending rejections of record.;

-The prior art cannot be used to reject applicant's claims under 102 e since it fails to disclose all of the features which are claimed by the applicant.; and

-The prior art cannot be used to reject applicant's claims under 103.

The examiner must disagree.

-The examiner mistakenly forgot to reject claims 12-13, and 18 under 102 e over Qian et. al. The examiner has corrected this over sight.;

-Since Qian et. al. employs all of the same materials (i.e.-substrates to be etched, etch gases) as those which are claimed by the applicant, the same etch results as those which are claimed by the applicant for their etching process would have been expected to have been achieved in Qian et. al.;

-Qian et. al. teach in their abstract, that their cleaning gas combines with a thin, non-homogenous etch residue deposited on the surfaces of the walls and the components of the etching chamber. The cleaning gas recombines with the etch residue on the interior surfaces of the etching chamber in the process of etching it. Thus, all of applicant's claimed limitations are fully met in this regard. Also, the cleaning gases used in Qian et. al. would have inherently had a lower recombination rate with the internal surfaces of the etcher than that of the etching gases would have had with the internal surfaces of the etching chamber since the cleaning gasses produce no etching deposit on the internal surface of the plasma etcher while the etching gases used do. Further, the recombination rate of the cleaning gasses with the film produced when the etching gas reacts with the internal surfaces of the etcher would have inherently been approximately the same as that of the recombination rate of the etching gasses with the internal surfaces of the etcher based upon the following. The etching, and cleaning gasses are combined in a manner such that there is no need to clean the etcher after conducting the etching process since the cleaning step simultaneously removes any etching residue deposited onto the internal surfaces of etching chamber during the etching step.; and

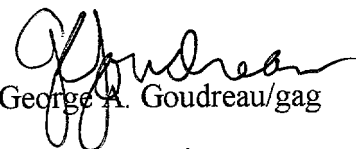
-Qian et. al. teach the usage of a plasma etchant which contains all of the components which are specifically claimed by the applicant in the last paragraph of column 8 as well as numerous other sections of this patent. (Note applicant's usage of the phrase "... and mixtures thereof..." in the last paragraph of column 8 to describe their plasma etchant.)

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner George A. Goudreau whose telephone number is (703) -308-1915. The examiner can normally be reached on Monday through Friday from 9:30 to 6:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Examiner Gregory Mills, can be reached on (703) -308-1633. The appropriate fax phone number for the organization where this application or proceeding is assigned is (703) -306-3186.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) -308-0661.



George A. Goudreau/gag

Primary Examiner

AU 1763